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Third Semi-Annual Meeting of the American Gas-Light Association,

AT WASHINGTON, D. C., MAY 12, 1875.

[Continued from page 6.]

The President—Mr. Breese, do you intend to leave the impression, on the whole, that this is too hot a fire?

Mr. Breese—It is too hot without the air. You saw the fire we made with coal-tar when you were there.

It is not possible to use the coal-tar in that way unless you have some way of admitting air. Where I introduce my tar-pipe I leave a square 4-inch opening for the purpose of keeping down the heat. Mr. Walker speaks about smoke. Sometimes we have smoke, and sometimes not. We do not pay any attention to that at all. We pay attention to the heats and the amount of tar consumed. We burn a barrel and a-half of tar, or a little less (I will say a barrel and a-half as the maximum) to the twenty-four hours per bench.

The President—How much coke do you use?

Mr. Breese—From 40 to 45 bushels—43 bushels to the average. We retail our coke at ten cents a bushel, usually, where the people come to the works and get it in quantities of from one to five bushels; but we base our calculations on seven or eight cents a bushel, at which price we sell it in larger quantities. We have two boilers at the works, and during this excessively cold winter we have been more or less troubled with the cold, and have only on one or two occasions used two boilers. I think, as near as I can get at it, taking the winter through, that we have used from five to eight bushels of coke under the boilers per day—I mean 24 hours. There is no extra labor in using coke under the boilers. The same man who runs the exhauster runs the boilers. But the fuel has been increased from five to eight bushels, depending on the weather. The retort-house, in which the steam and tar is used, is about 125 feet from the engine-room, and I have had the steam-pipe leading to the tar-benches, frozen up once or twice during the winter, when the thermometer was 18 to 22 degrees below zero, and run along for months about 8° below zero.

Mr. Walker—Will the gentleman be kind enough to tell us what his yield is? I want to get at the quantity of tar he uses, and the quantity of coal he carbonizes. I want to ask his yield per pound, if he has no objection to answering it.

Mr. Breese—I get over five feet, but that don't cover what I use. I had rather be excused from entering into that discussion. On my coal benches I use naphtha and coal in conjunction, and we average over five feet. I can not claim any advantage from laying off on Sunday; but we run from 5 to 5¼ feet. I am running one bench of fives on naphtha. I make a little over 5,000 feet per retort on the coal benches.

Mr. Edgerton—I think more explanation is necessary in regard to the different results. Figuring it out as the saving of 6,000 bushels at ten cents, would be $600, and $20 for the tar; or taking the result of one barrel of tar per day, at $1·25, as against coke at 44 bushels at ten cents, is $4·40—which is quite a little item of difference in the result. The result for a long period of time is considerably less than that for a day.

Mr. Breese—There is one consideration that has been left out. You do not take into consideration at all the labor. I run 9 benches, and the same man who runs the 9 benches on tar, attends to the coke fire, and in fact it requires no attention at all. Mr. Price was there a short time ago, and remained two or three hours, and I do not think during the whole time he was there there was a man who looked inside of the door of the fire. My calculation is that a month's gain, labor included, was, if I recollect rightly, about $219 in round numbers, burning tar. We do not make enough to run all the benches. If I could run the whole of my benches on tar, one man would run the whole twenty-four benches and attend to the whole of that business.

The President—You mean so far as firing is concerned?

Mr. Breese—Yes, sir.

The President announced that there were two applications for membership—Mr. Charles Nash, superintendent of the Williamsport Gas Works, Williamsport, Pa., and William H. Bradley, constructing gas engineer, Brooklyn, N. Y.

The question was put by the president, and the gentlemen were duly elected and introduced to the association as members.

Mr. Helm—Mr. President: I have heard some gentlemen express a desire to hear your experience in regard to purification.

The President—I will say to the association, that not anticipating anything of this kind, I neglected to bring with me any statistics; but I can inform the association what we are using, and my general impression of the result, how we regard it. We have been using, for a year perhaps, a combination of oxide of iron and saw dust, and also slaked lime. We use them in the proportion of one-third of each in weight. The bulk consists of one-third in weight in iron, one-third in weight in saw-dust, and one-third in weight of lime. We also use, in wetting up the compound, dissolved copperas water. It purifies very nicely indeed. Our gas is very pure. We have had during the last year a city inspector, who is a competent chemist, and he has reported our gas as pure. We have made very nice gas during the past winter. It has run from 15 to 17 candles—averaging 16 candles certainly. We use this material over and over again, of course. We have not been obliged to renew that which we commenced using more than a year ago. We are using the same material over and over again. Of course the cost is very low, but I can not give you the exact figures, as I should be happy to do if I had them with me; but it is quite low. We like the system very much. The only objection we find is, it takes a pretty large amount of space to spread the contents of the different boxes as they come out, and give them time to revivify. The revivication process is rather slow, and it takes considerable space. That would not be a matter of importance to many who have room.

A member—Does it take as many men to manage that as it does lime?

The President—About the same number. I think the saving in labor is not much.

A member—You think it is quite as economical as lime?

The President—It is much more economical than lime. I should say, however, that our method is this. We lay on the tier of trays near the bottom—within four or five inches of the bottom of the box, and then fill in by wheeling in with a wheel-barrow, until we fill the box up, say two feet—just upon this one tier of trays. Then we spread another tier of trays and put on about two or three inches of slaked lime to take out the carbonic acid, That is all we put in.

A member—Do you find that that increases your pressure?

The President—No, sir. The saw-dust holds the lime and iron up—not in solution, but bears it up in such a way that there is plenty of room for the gas to percolate through, and the pressure is not increased.

A member—What is the percentage of carbonic acid in your gas?

The President—I cannot tell you that; I know it is very small. When in Paris last November I went to the large works where they employ 1200 men, and I found they were using what seemed to be identically the same thing. The superintendent could not speak English very much, and I could not talk French very much, therefore could not explain ourselves and our ideas to each other; but I examined the material and was satisfied that it was precisely the same as we were using. The gas in Paris gives a white and beautiful light, but it seemed to me when I returned that ours was as good, and I believe the gas we made during the last winter was as good as that used in Paris, and we use the same system of purification. Mr. Helm—you saw the gas of Paris: what do you say of it?

Mr. Helm—I should think your gas was quite as good. It did not strike me as being any better than that we have here. I think they run on a little heavier pressure than we do here.

A member—Do you have any trouble with your boxes of oxide—the over-heating of the boxes. Is there any danger of its taking fire if left in the box over night?

The President—No, sir; we have not had any trouble since we have learned how to handle it. But when we first began to use it our men didn't understand it very well; and in one or two cases (not in the box, but out in the space where it was revivifying) it heated and actually took fire. That was entirely on account of a want of knowledge of how to manipulate it.

Mr. Breese—We have had one or two fires in the box, and I should like to know something more about it.

Mr. Sutton—We have used it for four years perhaps, and I tried different ways about it, but I finally adopted this plan. I take a bushel of iron-parings and a bushel of sawdust—not from any reason why I should do so, but I thought I must fix it with something to keep it open and prevent its getting solid. I took these two, mixed them together, and I took the liquor from the gas works and put it upon them, and for four days it worked, then got cold, and was ready for use. We commenced using it, and after revivifying I noticed it grew weaker. It would revive, and we would use it over, but it grew weaker. We then adopted the plan of adding a little iron at each revivification, to prevent its running down. We never mixed anything with it, and we kept on for years using the same material. We took away the poorest of it and threw it out, because the bulk keeps increasing and have to get rid of some of it. But we had added to it perhaps 12 or 15 bushels more, or perhaps 100 lbs. of iron parings, sometimes 75 lbs., sometimes not so much, and we have worked that for years. I have heard a good deal about the illuminating property of the gas being injured by it. I don't believe it is. I have not any positive experiments to relate, but I tried this plan. I took a fixture and put a light on each end, with a burner of exactly the same size on each end, the one I run through lime and the other it came direct without passing through the lime. With the eye I could not detect any difference at all, though I had a six-foot burner.

Mr. Sherman—My experience in taking out carbonic acid apart from sulphur is, it takes about as much time as it does to remove the carbonic acid and the sulphur together. It is no saving if you take out the carbonic acid.

Mr. Breese—Mr. President: Did you ever test your gas for carbonic acid impurities?

The President—We have no means of testing ourselves, but the city gas inspector, who is a chemist, did test it. The facts that are inquired for might be of some interest, and I will endeavor to communicate through the GAS-LIGHT JOURNAL what the results are. I regret I did not bring the facts with me.

The Secretary, Mr. Nettleton, read the following paper

ON THE SUBJECT OF LEAKAGE.

Mr. President and Gentlemen of the Association: I propose to communicate a few thoughts on unaccounted for gas, and a mode of its computation.

Unaccounted for gas is one of the stern and practical realities which every gas engineer meets daily in his work. No company, however perfect their manufacturing and distributing apparatus may be, is free from its evil effects, and to others less fortunate in condition, the prosperity of the company is seriously injured by it, and not unfrequently it is the cause of absolute ruin financially.

Confessedly this is a subject in which all manufacturers of gas are deeply interested, as with unrelenting certainty the value of the gas which has disappeared in this unaccountable manner, appears at the end of each month or each year in the profit and loss account on the wrong side of the ledger as so many dollars and cents vanished, leaving nothing as its equivalent.

It is not expected by this paper to add anything new to the gas knowledge of the day, but rather to lead to beneficial results by the bringing of the subject before the association for discussion, in order to discover the best remedy for the evil, and that a partial check at least may be put to this continual every day disastrous drain.

For a proper consideration of this subject we must define with some degree of exactness, what we mean by "Unaccounted for Gas," and to do this, some preliminaries have to be settled.

First. The station meter. It is the initial point as to quantity. upon which all the other points of the problem depend. That being so, it becomes a necessity that the station meter should be as well made as the mechanic arts and our mechanic skill will permit. The water line in it must be determined with the nicest accuracy, and the water uniformly kept at that line. The past experience of gas engineers has established as a rule of comparison, that the gas must pass into the station meter at a temperature of 60° Fah., under a barometric pressure of thirty inches. A variation above or below this temperature will make a difference in apparent quantity of one foot in every 490 feet passed at the meter. For convenience sake we will call it in round numbers one in five hundred. Two feet in every one thousand. For every fall or rise in the barometer of 1-10th of an inch a difference is made in the apparent quantity of gas passed at the meter, of 3½ feet in each 1000 feet.

Now, having got our starting point settled, by getting the gas manufactured accurately measured by the station meter, we may make a more precise definition of the term "unaccounted for gas," as we propose to use it. The quantity of gas registered by the consumers' meters may be termed accounted for. The quantity used by the street lamps may also be termed both accounted for and paid for. The gas used at the various offices of the company, and also at the gas works is, properly speaking, to be classed as accounted but not paid for.

These three several quantities being aggregated and deducted from the quantity indicated as having passed the station meter, the difference is strictly and properly speaking, the unaccounted for gas. Some of the unaccounted for gas is actual, and other parts of it apparent only. The actual unaccounted for gas is chiefly caused by three sources of loss; one, leakage from the mains and the service pipes, and one other source is gas consumed at the street lamps, over and above the quantity measured or estimated to have been so used, and the other, consumers' meters often run too slow, and do not register all the gas which passes. A thorough overhauling of all suspected meters, without delay, and of all the meters used in every three or four years, should be made by every company, as the remedy for this part of the evil. Apparent loss of gas may come from several csuses. One, the water may be too high in the station meter, causing it to register more than the proper quantity, and apparently a very large yield per pound of coal. Another, the gas may have passed the station meter at a temperature above the 60° Fahr., and thus the quantity apparently be increased by two feet on every thousand for each degree of temperature at which it is passed above the 60°. Another; it may have passed the station meter, while the atmospheric pressure was less than that of thirty inches, and thus be increased 3½ feet for every fall of 1-10th of an inch barometric pressure below the thirty inches. On the other side, it should be mentioned, that if the gas passes the station meter at a temperature below 60°, the proper quantity is not registered but a less quantity would also be registered. The quantity of gas is also affected by passing through the main pipes and consumers' meters at a different temperature than that at which it passed the station meter. If it is passed through the consumers' meters while the pressure of the barometer remains the same as that at which it entered the holder, through the station meter, no apparent difference will arise.

The gas is supposed in practical working to pass the consumers' meters at or about the same temperature of 60° at which it has passed the station meter, but the soil in which the main pipes are laid frequently reduces the temperature of the pipes, and of the gas passing through, below the normal temperature of 60°, so that the quantity will appear to be diminished when in fact there has been no leakage. During the past severe winter in the whole northern part of the United States, and perhaps I may say extending down well towards the southern, the continued cold weather caused the frost to penetrate so deep as to reach the gas mains in most places, and at my own works a curious result was developed.

I was satisfied that there was an apparent loss in the month of February of about three per cent., to be traced directly to this cause. So great an increase of the unaccounted for gas had never before appeared in the month of February. The month of March showed substantially the same result. Another cause of unaccounted for gas is generally regarded by gas engineers as arising from condensation, but it is believed that where the gas is properly made there is very little or no condensation.

Unquestionably, where gas has been copiously washed with water, it is more or less saturated with watery vapor, which may, to a certain extent, increase the bulk, as it passes through the station meter, and if afterwards it should be brought to a considerably lower temperature, such vapor may be condensed out of the gas, and to a limited extent the quantity will be decreased, but if the gas shall have been washed by gas liquor so called, it is not believed that any vapor will be carried forward in the gas which will be condensed out of it by colder temperature. The vapor of naphthaline is sometimes condensed out of the gas causing the odor in the water pumped from the syphons or drips from time to time; but it is believed that this vapor is so small in quantity as not to have any appreciable effect upon the quantity of gas. Having found that the great bulk of unaccounted for gas was caused by leakage in the mains and service pipes, it becomes important to inquire how that leakage may be prevented. In the early manufacture of iron pipes for gas mains, the iron put into them was so granular and porous that a large leakage was caused by the gas passing through the pores of the iron, at all parts of the pipes. At the present date the quality of the iron used in casting mains has been very greatly improved, but even now it is believed that a very considerable amount of loss is caused by leakage through the pores of the iron, although the pipes are apparently sound; so that the main pipes should be made of the best iron put into that class of work, and gas engineers should give preference in buying to pipes made from the best iron, even at a higher cost.

Of course every gas engineer knows that the mains should be well laid, well caulked with dry gas and lead or Portland cement; or, if conveniently obtained, old tarred rope, old junk, so-called, which will almost make a gas-tight joint of itself, if well driven home.

We all know that lead well-packed makes a perfect joint. There may be some question about the use of Portland cement. In those parts of the country where the frost does not penetrate deep enough to reach the mains, and the ground on which the pipe is laid is solid, making a firm foundation for the mains, Portland cement undoubtedly makes a perfect joint; but in those portions of the country where the frost reaches the pipes, the cement makes such a rigid unyielding joint, that the main pipe will frequently break in another place before it will draw or yield at the point where the joint has been packed with cement, and it is recommended that if cement be used in the northern portion of the United States, that a a lead joint should be made once in every 100 feet, so that the contraction of the main by the frost may draw at that joint, instead of causing the pipe to break in two, or drawing at the cement joints, which latter, if it take place, must inevitably make a leak, as the cement makes a rigid unyielding joint. In all cases where the ground is soft or liable to be disturbed by other causes, so as to cause a sinking of the main, lead should be used for the joint.

Every gas engineer knows that the tap for service-pipes should be drilled in perfectly round and true, so that the threads of the screw should bite in at least two of its circuits.

Having got the mains made of good iron, into the ground, with the joints properly made with lead or cement, well driven home, and the same properly tapped for service, if we find any considerable quantity of unaccounted-for gas, we may safely conclude that there is leakage in the mains; and then comes the important question of how to find where it is.

The locality of the leakage may be approximately ascertained by districting the mains of the company, which is accomplished by the use of valves in the mains at the points necessary for that purpose.

Closing a valve and inserting a piece of service pipe on each side of the valve into the main—these two pipes rising to or near the surface of the ground—then by placing a consumer's meter at the valve, and connecting the pipes so inserted into the mains with the meter, by pieces of india rubber tubing, the quantity of gas-leakage in that district will pass through the meter, and so be easily and very accurately ascertained.

The writer tried this method upon about one mile of pipe, consisting of one-half six-inch, and one half 4¼ inch, where at the time it was believed there was considerable leakage, and was gratified to know, that only six feet per hour passed through the consumer's meter; making a perfect demonstration that the leakage was not in that district, and soon afterwards it was found to be a broken pipe in another district.

Let me urge upon my brother gas-managers the benefits to be derived from the plan of dividing off their gas territory into districts—there is much money saved by it.

These two pipes each side of the drip were left standing, and the district was tested several different times afterwards, and on different days, resulting with precisely the same quantity of six feet per hour passing through the consumer's meter. Thus it was rendered certain that no leakage of any larger magnitude than that existed in that district of pipe.

By t is means an expenditure of money was saved, more than sufficient to pay for the valve and its insertion into the main. Besides, there is another benefit arising from this mode of proceeding:

In case of fire in any one district, that district may be shut off, and all other parts of the territory may continue to be supplied in the ordinary way.

The desirableness of the district process was made most apparent in the city of Boston, at the time of the large fire there a few years since, and I am informed that at present the Boston Gas-Light Company has been at a very considerable expense to thoroughly district the whole territory occupied by the mains of that company; so that, probably, no city in the United States or Europe is as well provided for in these respects for the emergency of another fire, or to ascertain the leakage.

Having ascertained the district in which the leakage exists, so far as lies in the power of the engineer, the next thing is to find its special point in that district of main.

In two companies in which I am interested, the process of finding the point of leakage, has uniformly been that of taking a light bar or piece of gas-pipe, with a sharpened steel point on the end, and holeing down to or near the pipe once in every six feet. Once in twelve feet would probably discover a leak of any considerable magnitude, but for thorough work it should be once in six feet; and by this process, a leak which is so small that it cannot be lighted with a match, will surely be discovered.

Some may say that there is danger of breaking the main. My answer to that is—that in no instance in my experience has a single breakage occurred.

The same process used to discover the leakage of gas in the street mains applies also to the finding of the leakage in the service pipes.

As to the discovery of unaccounted-for gas used in the street lamps, I know of no way to find that except by testing the burners with a proper burner-tester, under the same pressure as that which prevails at the point where the burner is used, or by a lamp post meter usually called "the average meter system."

Pressure is an element in the problem which increases or diminishes the quantity of unaccounted-for gas, and increases or diminishes the leakage, as the pressure is greater or less.

Following the same law, as far as leakage is concerned, as it does in the delivery of the gas through the mains—that is, four times the pressure doubles the quantity of the leakage, so that it becomes a matter of great interest to every gas company, that their street mains should be large in size, in proportion to the quantity of gas required to pass through them, in order that the proper quantity of gas may be passed and delivered to the consumer at a comparatively low pressure. The pressure is generally regulated at or near the works or holder, and sometimes at the point where the gas is passed to a district at a higher elevation, by some of the different forms of gas governors. When the gas is burned at a pressure of from five to eight-tenths of an inch, it gives the consumer the greatest quantity of light for the amount of gas consumed; that being true economy for the consumer is also true economy for the gas company. The pressure being light, the leakage will be light also.

The main and service pipes both being large, the necessary quantity of gas will be easy to supply under that light pressure. The pressure through the day may be lighter than that of the burning hours in the early part of the night, and should be attended to by the person in charge so as to relieve the pipe from pressure, and consequently prevent loss by leakage.

I have thus indicated some of the more prominent points to be considered, and I come to what is a proper method of computation of the unaccounted-for gas.

The usual and almost universal way has been to reckon the same at a percentage upon the gross amount passed by the station meter. This has always been unsatisfactory, as the quantity of gas made during the different months of the year varies so greatly, between the summer months and the winter months; the quantity passing the station-meter being nearly three times, and in some instances four times, as great in the winter as in the summer, to supply the same consumers.

The leakage while passing through the same pipes should be no more in winter than in summer. Thus the percentage of leakage is a constantly varying percentage, as the quantity of gas made and consumed is a varying quantity.

The mode of computation used by myself has always been a reckoning of the unaccounted for gas as found each month, at so much per mile of pipe per day. Then by comparing one month with another, it is easily ascertained whether the loss was in fact greater or less one month than in another, or in any other during the whole year.

We have here a certain and uniform basis of computation, unchanging from one part of the year to another, or from year to year; neither does the greater quantity of gas made in the winter or the lesser quantity in summer make any difference with it. Permit me to hope that this method, or some other equally certain and uniform, may be adopted by the whole gas world, for the computation of unaccounted for gas.

I here give figures covering one year in time, in a company I am interested in, not as showing a wonderfully small unaccounted for quantity of gas, but for the purpose of illustrating my method of computation. These figures are on a basis of ten miles of pipe all brought to a standard of four inches diameter, and the quantity given is the number of feet per mile of four-inch pipe per day:

January	102
February	122
March	191
April	90
May	143
June	174
July	184
August	236
September	173
October	167
November	186
December	78

The gross amount of the loss ascertained from time to time, when the record of the consumers' meters is taken, standing out prominently before the engineer in one total amount, immediately suggests the loss of so many dollars and cents, and thus each month he is reminded of the amount of his loss, while if the loss is computed by percentage in the winter months, the apparent gain by a less percentage gives a sort of ease at the idea of the apparent improvement, and leads to no active effort for its reduction. By computing it at so much per mile; a standard which is uniform, month by month, and year by year, is provided. In working by this standard, if the loss is equal each month, with the month before, the engineer is satisfied that the condition of his pipes remains the same, but if there is a greater loss it is shown to him at once, and he is admonished that it is necessary for him to act in the matter by way of its reduction.

If a comparison of the working of one company with another shall be desired, that is easily ascertained by bringing the number of miles of pipe of each company to one uniform standard of size by computation, say four or six inches. The circumference of every size of pipe being in fact the source from which leakage arises. So that in this respect a uniform standard is easily obtained. It is not claimed to be absolutely perfect, as the number of services on any given number of miles of pipe may vary, and to the extent that the service pipes induce leakage that will be a variation; so also the working pressure may be different, but this can be calculated. If by presenting these suggestions I shall have brought to the mind of any gas engineer a new thought or suggestion, which enables him to reduce his unaccounted for gas, and to that extent increase the credit side of his profit and loss account, I shall be amply compensated for the effort. I shall be most happy to hear from the members of the association, their ideas on this subject.

After the conclusion of this article a vote of thanks was unanimously tendered to Mr, Nettleton for the same.

Mr. Helm—I wish to state a peculiar case to see if any gentleman present can give any similar experience to it. The case is this: An unoccupied house was rented for an evening's entertainment, and the gas had been turned off for some time, but we had not removed the meter, and we were not applied to to turn the gas on, and we knew nothing about this renting of the building for that purpose. They used lamps or candles for lighting, and during the evening some fellow thought he would have the gas and he went down the cellar and turned on the gas, and the gas leaked out between the ceiling and the floor above, and they never noticed anything at first, but they began to smell the gas soon, and after a while the thing went up, the ceiling did, about two feet, and came down as suddenly, breaking things generally. They carried us into court and wanted to hold us responsible for the thing. If we are responsible for anything of that kind there is no use for insurance companies, for any miserable devil can blow up his house and come back on the gas company for damages. Is there anybody else who has had an experience of that kind?

Mr. Neal—There is no doubt on my mind, and cannot be in the mind of any practical person, that the company is not liable in the least for such damages, as they did not arise through any action of their agents. By profession I am a lawyer, and I should not be willing to act as counsel for complainants in such a case, and I don't think any lawyer would who regarded his reputation.

The President—It strikes me that your mistake was that you did not turn off the gas on the street.

Mr. Helm stated it was a case where there were two meters on one service.

On motion of Mr. Neal, the secretary was authorized to make proper arrangements for the annual meeting of the association, in October next.

The president suggested that the burning of tar as fuel was a topic which should receive further attention at the next meeting.

Mr. Helm—The inquiry has been made as to the best kind of gas burners for 18 or 20 candle gas, or upwards. I should say the argand, myself, but that is objected to sometimes by others.

Mr. Sutton—A six-foot bat-wing burner I find will smoke if you turn on the flame to the full size. The 4 foot lava top burner I get good results from.

Mr. McIlhenny—I suggest the propriety of the president's appointing three gas engineers to read papers at each meeting. Unless some arbitrary rules are adopted, it will be difficult to keep up an interest in the meetings.

A member suggested that Gen. Hickenlooper prepare a paper on the subject of cooking by gas, to be read at the next meeting.

Gen. Hickenlooper accepted the suggestion, and stated he would prepare a paper on that subject.

By request of the president, Mr. Breese agreed to prepare a paper on coal tar as a fuel.

On motion of Mr. Neal, the thanks of the association were tendered the acting president (Mr. Price) for the very able and acceptable manner in which he has discharged the duties of presiding officer at this session.

On motion of Mr. Dunbar thanks were extended to the publishers of the GAS-LIGHT JOURNAL, for their courtesy in reporting the proceedings of the association.

Adjourned to 9 o'clock, A. M.

[To be concluded.]

Corrosion of Pipes by Sewer-Gas.

At a recent meeting of the Society of Medical Officers of Health in London, Dr. Andrew Fergus, president of the Faculty of Physicians and Surgeons of Glasgow, repeated some statements he had made at the Glasgow Congress. Starting from the basis that typhoid fever was induced either by drinking polluted water or by inhaling polluted air, Dr. Fergus showed that in Glasgow, where the entire water-supply is derived from Loch Katrine, and conveyed through pipes in such a way as to preclude the possibility of excremental pollution, typhoid fever had gone on increasing in a most surprising manner. Reciting many remarkable facts in connection with cases of typhoid and diphtheria that had come under his notice, he exhibited several pieces of 4-inch leaden pipe curiously perforated upon their upper segments by corrosion commencing from within, and which could only have been caused by the action of sewer gases. These perforations had admitted sewer gas into the houses in which mysterious cases had occurred; but as corrosion did not take place in such parts of the pipe as were charged with liquid, the perforations never betrayed themselves by ordinary leakage. Dr. Fergus said that he had found that such pipes as were freely open to the sky by an upcast shaft remained sound nearly twice as long as those in which there was no effective ventilation; but he gave it as his opinion that leaden soil-pipes exposed to the action of sewer-gas were not to be depended upon as sound after they had been up ten or twelve years. He demonstrated that the present method of sealing sewer-pipes with water allowed sewer gas to diffuse itself into the house by a process of soakage, and that within a period of from half an hour to two hours the various sewer gases would saturate the water by which the trap was supposed to be sealed, and would thenceforth be freely emitted into the house. Dr. Tidy, while fully admitting the great importance of the subject raised by Dr. Fergus, argued that the corrosions must be peculiar to Glasgow, and due probably to the water of Loch Katrine, or other local cause. Dr. Edmunds, on the other hand, stated that he had several times seen exactly similar corrosions in London, occurring generally in the upper parts of the D trap, and he thought that Dr. Fergus had explained the real source of many mysterious cases of typhoid and diphtheria which had occurred in high class houses, where no sort of leakage or apparent unsoundness of the soil-pipes had been discovered.

Chemical Repertory.

No. 136.—July 16, 1875.

EDITOR—HENRY WURTZ.

CHEMICAL EXCERPTS.

1452. THE GREAT PITTSBURGH OLEODUCT.—The latest report concerning the doings of the Columbia Conduit Company is, that they are having built large tank wagons, with which they propose to transport oil across the track of the West Penn. R. R., and thus to solve the vexed question as to whether they con-do-it or con-not-do-it. What objection the almighty Pennsylvania R. R. Co. will have to make to this procedure is not now known, but we do not doubt it will in due time appear.—*National Oil Journal.*

1453. IMPROVED STARCH.—A beautiful finish can be given to articles to be starched by taking one fourth of a pound of starch, and working it over and kneading it with a little water, then placing five or six pints of water in a pan, and adding to this a very small quantity of powdered borax, a small piece of sugar, and a fragment of white wax about the size of a hazel nut, and heating the whole sufficiently. This water is then to be added to the starch, with continual stirring, mixing the two together until the whole is as thick as is convenient for application. If the articles are to be made quite stiff, the strength of the starch may be increased two or three fold.—*Boston Journal of Chemistry.*

1454, ENGLISH PATENT.—*Alizarine and Isopurpurine, from Anthracene.*—Gustav Auerbach and Theodor Gessert, Elberfeld, Germany, April 13, 1874—No. 1260.—According to this invention anthracene is heated with concentrated sulphuric acid to a high temperature; the product is diluted with water, and is neutralised by an alkaline carbonate or with caustic alkali. The mixture then contains the neutral sulphates of the alkaline bases employed and acid sulphates thereof. The neutral sulphates are removed by filtration or crystallisation, and the acid sulphates are neutralized by a further addition of carbonate of soda or potash. The product neutralised as described is then heated along with caustic soda or potash as long as a bluish or red color is produced. From this product a precipitate of alizarine and isopurpurine is obtained on the addition of an acid.

1455. TORPEDOES IN OIL-WELLS.—Col. Roberts, of Titusville, has always claimed a monopoly of the torpedo business as applied to oil wells. By suits and injunctions, and various other modes of annoyance, he has pretty successfully kept the field clear of competition. A successful resistant of his claims has at last been found, however, and the United States Court at Pittsburgh has refused to grant an injunction asked for by Col. Roberts. Men experienced in the business express the opinion that if the use of torpedoes was not hampered by patents and royalties, their use would double the production of petroleum.—*National Oil Journal.*

1456. THE LATE HIGHER PRICE OF OIL.—Having been asked often why petroleum rose during the last spring, we give here a clipping from that valuable periodical the *National Oil Journal* of March last. As oil has now gone down again to its normal price, the matter becomes only of historical interest:

"Much of the advance in crude petroleum has been purely speculative. Very little oil has been sold for immediate shipment. So little, indeed, that it has been hard to establish a quotation for days together. Evidence of this is now seen in the fact that the shipments from the pipe companies have been so light that their tanks are all full, and they cannot take the oil away from the wells. As a consequence, some oil it said to have been pumped on the ground."

1457. A FALSE REPORT CORRECTED.—It is well known that the last session of the Pennsylvania Legislature authorized a new geological survey of the State. The work has been prosecuted with diligence under the management of able men, and the first reports are already printed, and about to be made public. The work of surveying the oil regions has been under the special direction of Mr. H. E. Wrigley, C. E., of Titusville, than whom no one could be found better fitted for the work. That his report will prove of great value in disseminating correct information in regard to the oil field, and the probable permanence of the supply, we have no doubt. The statement recently made by the *Tribune*, and attributed to Prof. Lesley, that he and his assistants had met with opposition by the oil producers, under the plea that a survey would lead to increased development, and consequent depression of the price of oil, has been positively denied by Prof. Lesley himself.—*National Oil Journal.*

[We were ourselves misled by this statement, and are very glad to be enabled to make such amends as we may, by helping to circulate the denial.—ED.]

1458. AMERICAN RUSSIA IRON.—Russia sheet iron is a name indiscriminately applied by Tom, Dick and Harry to any planished or fine surfaced sheet iron, the manufacture of which may be attempted. We believe that at any one time within the last century, from one to a dozen persons could be found in the United States carrying around samples of smooth surfaced sheet iron, which they proposed to manufacture almost as cheap as dirt, and which was to be the "simplest thing imaginable" to make. Patents have been taken out, capital invested, and rights sold in nearly every iron working State in the Union, and after all, W. D. Wood & Co., of McKeesport, Pa, and Allen, Wood & Co., of Conshohocken, Pa., are, we believe, the only parties who make a Russian-American iron. These have been engaged in manufacturing it for over a quarter of a century; their planished sheet-iron is even more handsome than the Russian, whilst the quality is asserted as being equal. The care exercised in making this iron is so different from that taken with the ordinary sheet iron, as to be a matter of wonder to all who have seen it. When ready for market it is delivered in coverings of matting.—*Iron Age.*

1459. A RAILROAD TUNNEL UNDER NEWARK BAY.—The unsafe condition of the Newark Bay bridge during winter and spring, and the expense involved yearly in its repairs, has led the Central Railroad Company of New Jersey to seriously consider the practicability of building a tunnel under the waters of the bay from Elizabethport to Bergen Point. Prominent engineers consider the project an easy one to accomplish, owing to the general flatness of the bottom of the bay and the solid condition of the earth to be found there, the driving of piles having demonstrated that little sand is to be met with, and that for only a short distance out from the Bergen Point beach. A rough estimate places the cost of a tunnel for double tracks, extending a distance of two miles and a half, at $6,000,000, and which, if built, would last for a century. The bay bridge has cost the company fully thrice its original cost, as the chief engineer estimates that it has been rebuilt three times since its first completion. An iron structure across the bay would be little improvement over the old bridge, whereas the building of a tunnel would leave the waters of the bay free to navigation. The matter will in all probability assume a definite shape within a year.

1460. THE NEW OIL TERRITORY.—Much has been said of late concerning the discovery of oil near Warren, Pa. This town is on the Alleghany river, about 100 miles above the oil fields of Millerstown. The first well, owned by Mr. Beatty, was stated to have produced oil in considerable quantities for the first few days, but its production was then intentionally decreased or entirely stopped, in order to facilitate the purchase of territory. This statement was denied by some, who asserted that the well never produced oil in paying quantities. From personal conversation we

gather that the well actually did produce oil in paying quantities, and that it can be made to do so again whenever it is desired by its owners. A second well has now been struck in the same neighborhood, which is now producing about twenty barrels a day of amber-colored oil. The latter fact indicates that the well will not be a large producer, but is not a certain indication that the territory will not produce largely. We regard these two wells as important only as proving that the boundary of the oil field has not as yet been reached.—*National Oil Journal, June* 15.

1461. The New York and Long Island Bridge Company.—The meeting of the stockholders of the New York and Long Island Bridge Company across Blackwell's Island, from Seventy-seventh street, New York, to Astoria Heights, took place in compliance with call, June 20, at the offices of the Metropolitan Insurance Company, corner of Pine street and Broadway, when the following Board of Directors was elected:

Herman O. Poppenhusen, of College Point.
William Steinway, of New York.
Pliny Freeman, President of the Globe Life Insurance Company.
Oswald Ottendorfer, proprietor of the *Staats Zeitung*.
John C. Jackson, of Astoria.
Oscar Zollikoffer, President Metropolitan Gas-Light Company.
Herman Funke, of H Boker & Co.
Edward J. Woolsey, of Astoria.
R. M. C. Graham, President Metropolitan Insurance Company.
Edwin Einstein, of Hirschorn & Co.
Charles A. Trowbridge.
C. Godfrey Gunther, ex-Mayor of New York.
Abraham D. Ditmars, Mayor of Long Island City.
Herman T. Livingston, of New York.
Archibald M. Bliss, of Brooklyn.
John T. Conover, of New York.
Willy Wallach, of New York
Paschal W. Turney and Gottlieb Gunther, of New York and Ravenswood.
Charles H. Rogers, of New York and Ravenswood.
Charles F. Trethar, of Tremont and New York.

It is stated that these gentlemen will so "push things" that the bridge will be "a fixed fact" in two years time. Many of the names are good warrant for a belief in this.

Gas Items.

Nashville, Tenn.—From the *Republican Banner* of this place of June 27, we clip an account of an improvement made by Mr. Geo. H. Wells, the Superintendent of the Nashville Gas-Light Company. We should like to learn more about it. It is stated that "a vote of thanks was presented by the Directors of the Company to Mr. Wells." The following is what we learn from the *Banner:*

"This invention relates to means for purifying illuminating gas for the purpose of depriving it of the ammoniacal liquors and tarry matters, and the nature of the invention consists in a novel arrangement of sectional grids in a vessel through which the gas is caused to pass, which grids are composed of round rods of cane, or other similar material. Between and over these the gas is required to pass, dividing it into fine streams and causing it to deposit the tarry matters and ammoniacal liquors. By this arrangement the ascending volume of gas is broken up into small streams at each grid, and the tarry matter and ammoniacal liquors are deposited on the rod, and drip from grid to grid, thereby washing, cooling, "scrubbing," and condensing the gas with its own liquor, and retaining in the gas its carbon or illuminating power.

"The above invention has been in successful operation for the past nine months in our gas works, and has given entire satisfaction, having increased the volume and illuminating power of the gas, at the same time having materially decreased the quantity of lime used in purification."

Spontaneous Combustion.—Some very curious denials have been put forth by the *Coal and Iron Record*, editorially, on the subject of the alleged "spontaneous combustion" of cargoes of gas-coal, which will require much further corroboration, we apprehend, before they will pass current. June 9, this Journal (which, by the-way, we learn has just been merged into the *Engineering and Mining Journal* says:

"There never has been a case legally proven of spontaneous combustion of coal on board ships, in yard, or in mine. The cause of the destruction of ships by fire laden with coal may be attributed to the same cause as when laden with other cargoes—first, incendiarism, and, secondly, carelessness, as by the dropping of a match or lighted segar or pipe, or other accident.

"The most inflammable character of coal carried in ships is gas-coal from the Nova Scotia mines. We have yet to record the loss of one of these vessels from spontaneous combustion.

"Until we get more direct proofs, we are not willing to accept theories as facts, simply because a learned professor and a great many other people think its is so.

"The theory of spontaneous combustion of coa has been so generally promulgated of late years that it now consists in offering a premium to the master of every old hulk in the world to purposely load a cargo of bituminous coal, insure both cargo and vessel, and then set fire to both. When news of the disaster is reported, we have it: Good ship Humbug burnt at sea on the 10th inst. Cause of fire, "spontaneous combustion of cargo of coal." Insurance paid."

Visalia, Cal.-This town expects to have gas-works; the illuminating property being derived from crude petroleum.—*Sci. Press.*

Jersey City.—The *Journal* asserts that the Jersey City Gas-Light Company have been charging the city for 976 street lamps. Lamp Inspector Farrier counted them and can only find 966. The Company's Superintendent, John Winters insists on the former number, but refuses to accompany the Inspector on a counting expedition.

—June 2, in the "Police Board" of this city, Mr. Edmondson said that the new burners for street-lamps have been purchased, and would be tested at eight o'clock p.m. at the gas house, so that the Board can see whether the stipulated 3½ feet per hour will pass through them.

President Marinus took the floor, and after speaking of the inutility of the present vapor-lights for streets offered a resolution that the Committee on Lamps and Lights be authorized to advertise for proposals to furnish 100 vapor lights for Greenville, reserving the right to reject all bids if they think it for the interest of the city so to do. Mr. Edmondson said the contract with the Vapor Light Company forbids the use of any other light than such is as furnished by them. Mr. Marinus said that that contract was made before Greenville was annexed, and is therefore null so far as Greenville is concerned. The contract was read. There was a clause in it, which could be construed either that all territory which might be annexed, should be covered by the terms of the contract, or that the territory then constituting Jersey City only should be so covered. Mr. Edmondson argued the former construction, and Messrs. Marinus and Brigham the latter. Mr. Marinus said the contract calls for a good light, and it is not furnished, and, therefore, if the matter came before the courts this Board would not have to pay a cent. "The vapor lights are a disgrace to the city," said Mr. Marinus. The debate grew warm, the parties on both sides sticking to their respective ideas. The resolution was finally referred to the Corporation Counsel for his opinion as to whether the contract with the Vapor Light Company covers Greenville.

The Rawle furnace, at Erie, Pa., uses "natural gas" as fuel in iron making, and an improvement in the quality of the iron is claimed as the result.

Australia.—A colonial contemporary states that at the end of February last the gas-lamps of Ballarat, Victoria, were lighted in a novel way. The lamplighter, instead of having a ladder on his shoulder, and running as if he had not another moment to live, drove up to each lamp and lighted the gas. He was seated in a lightly-constructed gig, the seat of which is raised so high that the man can light the lamps without any trouble.—*London Journal of Gas-Lighting.*

Determination of Sulphur in Coal and Coke.—M. A. Eschka.—Powder as finely as possible 1 grm. of the sample, and mix intimately with 1 grm. of calcined magnesia and 0·5 grm. of anhydrous carbonate of soda. Heat over the lamp in an open platinum crucible, inclined so that only its lower half may be brought to a red heat. The ignition requires from forty-five minutes to sixty minutes, and the mixture should be stirred every five minutes with a platinum wire. The process is complete when the ash becomes yellowish or brownish. Let it become quite cold, and mix intimately with the ash, by means of a glass rod, ½ to 1 grm. nitrate of ammonia, and heat to redness for five or ten minutes, the crucible being covered with its lid. The residue is then placed in a precipitating glass and covered with water. The residue adhering to the crucible is detached by heating with the liquid, and the washings added to the solution in the glass. The sulphuric acid is then determined in the usual manner.

London.—The piece of ground between Blackfriars Bridge and the Temple Gardens, on the Thames Embankment, hitherto occupied by the Chartered Gas Company's works, has been purchased by the Corporation of the City of London for £170,000, with the object of removing the gas works and substituting new residences and thoroughfares.

Gas from Carbonaceous Shales.—J. T. Coleman lately told the London *Chemical Society* that if the gas which is produced in such large quantities in the preparation of oils by the distillation of shales is submitted to a temperature of 0°F., at a pressure of 140 lbs. to the square inch, a quantity of volatile hydrocarbons having a density of about 0·680 is obtained suitable to be used for air-gas purposes, or for increasing the illuminating power of poor coal gas. The amount of liquid condensed is about one gallon per 1000 cubic feet of gas. The latter, after the removal of these hydrocarbons, burns with a blue flame resembling that of a Bunsen burner.

Coal-Tar Benzole.—MM. G. Boiraux and E. Leger have been engaged with experiments on the use of certain oils of coal as substitutes for alcohol in the preparation of the alkaloids. They have investigated, for this purpose, benzoles boiling from 50° to 100°; common benzole boiling from 80° to 120°, and a mixture of the foregoing with 5 per cent. of carbolic acid. They remark that vegetable matters to be treated with benzole must previously be dried with the utmost care.

Russian Chemical Society.—For there *is* a Russian Chemical Society; and, indeed, there is now a National Chemical Society in every civilized country except America! How long must this be thus? A Russian chemist named Moun has made to this hyperborean society a communication having a most interesting bearing on the chemistry and coking of gas-coals. He has examined the amount of coke yielded by three isomeric bodies—Swedish filter-paper, starch, and gum. The first, when submitted to destructive distillation, yields 6·73 per cent. of carbonaceous residue; the second, 11·39; and the third, 20·4.

Litmus, and its Preservation.—Another Russian chemist, Martenson, tells us something of interest in the gas-laboratory—how to keep litmus solution. He found that a litmus solution will keep perfectly well

if the aqueous extract of the commercial litmus is purified by precipitation with 80 per cent. alcohol, solution of the precipitate in water, neutralization with dilute sulphuric acid, and evaporation to a syrup, separation of the mother liquor from the crystals of potassic sulphate, addition of glycerine to this deeply-colored liquid, and evaporation again.

Correspondence.

[Correspondents, in all cases, should sign their communications with their names and address in full—not necessarily for publication, but as a guarantee of good faith.—Ed.

Petroleum Gas.

Gas Works, Knoxville, Tenn.,
June 22, 1875.

Mr. Editor: I must emphatically dissent from your editorial in the last issue of the Journal, on the "Investigation of Petroleum Gas." I consider that the subject of petroleum and petroleum gas has already received much more than its due share of attention from the gas profession.

Oil gas in its various forms has been before us for eight years. There are in this country alone about seventy different processes for making gas from oil. It has been analyzed, investigated, and reported upon in these columns over and over again. More time and money has been spent upon it than its importance demands. I was therefore glad, and heartily endorse the action of the association committee, in presenting no report upon this subject at their late meeting. What more could they do? Have they the power to call spirits from the vasty depth of petroleum that do not exist there? Surely we all know by this time what a gallon of petroleum contains; but if there yet exists in it some subtle light-giving spirit or essence that has so far eluded the searching analysis of the chemist, then I know no one more fitted than yourself to bring it to the light and appreciate its importance. I think your idea of the association providing funds for the investigation of every new thing that comes to the surface, relating to the manufacture of gas, is simply out of the question. What association could stand it? and what committee could perform the duty? and what value would be attached to their reports? None whatever. Such reports would neither facilitate nor retard the introduction of any new invention.

Let us suppose for a moment that the committee did report, that they had in their service the best talent of the country, and that their report was unfavorable to oil gas, would such a report prevent simple people from sinking their money in oil gas projects? On the contrary, it would only give an impetus to the movement, as coming from men who were interested in the old coal gas process.

What further investigation do we require? Are not the facts staring us in the face? Has not oil gas had a fair trial both on a large and small scale? What about Saratoga, Memphis, and places nearer home?

You speak of the public misrepresenting the action of the association. The public care not one straw how gas is made; all it wants is good and cheap gas, and from my experience they prefer coal gas to any other, for in a neighboring city with whose gas works I am also connected, we have an oil gas works in full operation for nearly six months. They started with very flattering prospects, nearly all the consumers left the old company for the new gas. The process was a combination of all the latest inventions—oil was cheap; the old company lost money, the new company did'nt make any. To day the consumers have nearly all returned to their first love—the oil company is dying a natural death, and a number of honest people are regretting they ever heard of oil gas. I understand a gas company, right in the heart of the oil region, are erecting at a great expense a *coal* gas works. I think with such facts as these before us, the association committee were fully justified in not presenting any report, and requesting their discharge from a disagreeable duty, which ought never to have been imposed upon them.

Yours respectfully,
James Somerville, Sup't.

[Editorial Note.—The editor did not see Mr. Somerville's communication till it was in type, and the editorial page already filled. Mr. S.'s name and fame were very justly deemed a sufficient warrant for insertion without the usual editorial submission. Something in comment in our next. In the mean time, we are not sorry to present Mr. S.'s views to others, both in and out of the profession, who will doubtless have something to say, in objection to an acceptance of his verdict, as a finality.—Ed.]

Hydraulic Main and Ascension Pipes.

Troy, N. Y., July 9, 1875.

Mr. Editor: Among the many so-called improvements in gas apparatus now being patented, I notice in your last issue one for a hydraulic main and ascension pipes, the novelty of which consists in placing the main immediately over the mouthpieces of the retorts, supported on the front braces of the ovens, the ascension pipes passing directly through the bottom of the same, and the hydraulic seal formed by an inverted cup attached to the cover, etc.

Over an advertisement in the fourth number of your Journal, October 2d, 1859, p. 51, will be found an illustration of almost identically the same arrangement of main and pipes, which was at that time introduced into several small gas works erected by the undersigned: possibly in some of those works it may yet be in use; and it is more than probable that the patterns for castings of the same may still be found at the foundry of Messrs. Herring & Floyd of your city.

The objection to the style of main, however, was found to be in its producing results now so desirable to be avoided, viz., that of baking or thickening its contents, as a consequence of the heat to which it must necessarily be subjected, by the escaping gas and hot coke, from its situation immediately over the retort openings. Respectfully yours,

F. A. Sabbaton.

[Mr. Coombs, we doubt not, will pay due attention himself to Mr. Sabbaton's *critique*. We cannot help suggesting, however, that the special feature of the Coombs system, of cooling the gas in rhe stand-pipes, ought certainly to meet the point made in Mr. Sabbaton's last paragraph.—Ed.]

Utilization of Ammoniacal Liquors and Other Products from Gas-Works.

By Prof. Emil Kopp.

[Translated by S. Cabot, Jr., for the *American Chemist*.]

The first part of this article is devoted to the treatment of the liquids from the scrubbers, the only new suggestion being the addition of a small quantity of copperas to the gas-water previous to the distillation of the ammonia. This precipitates the sulphur as sulphide of iron. This distillation should be performed in an economical still (for instance Coffey's apparatus) and the gaseous ammonia should be put through properly constructed purifiers.

Prof. Kopp then turns to the so-called Laming's preparation. Laming's preparation consists of a mixture of sulphate of iron (copperas), and hydrate of lime. This mixture naturally forms sulphate of lime and protoxide of iron, which latter is quickly oxidized to peroxide. There is also a slight excess of hydrate of lime.

The already partly purified gas streams through trays covered with this mixture. Carbonic acid is absorbed by the excess of lime. Carbonate of ammonia gives with the sulphate of lime, sulphate of ammonia and carbonate of lime. Sulphuretted hydrogen gives with the peroxide of iron, first protoxide of iron and free sulphur, and later the protoxide of iron is changed to the sulphide. The sulphocyanic acid gives with the excess of ammonia, sulphocyanate of ammonia; and the cyanide of ammonia gives with protoxide of iron cyanide of iron.

When the mass has become so saturated that no more impurities are absorbed, it is spread out in the open air and sometimes a little copperas is again added. By this means the sulphide of iron is oxidized to free sulphur and hydrated oxide of iron.

The mass is thus regenerated and may be used over again with even more effect than before, owing to the more intimate and chemical mixture of the components. It can be used over in this manner twenty to thirty times, until at last it becomes too much charged with foreign salts to be of any value for purification.

It is now submitted to a treatment with water, whereby the ammonia salts are washed out. The liquid by evaporation yields crystals of sulphate of ammonia, while the sulphocyanide remains in the mother liquor. (The sulphate of ammonia from Europe is sometimes so contaminated with sulphocyanide as to unfit it for use as a fertilizer. The sulphocyanide of ammonium might be treated with lime to set free the ammonia, and the lime salt used to obtain the sulphocyanide of copper, a salt much used in the preparation of aniline black; or, it might be changed to ferrocyanide by proper manipulation.—S. C., Jr.)

The lixiviated residue now consists almost entirely of cyanide of iron, free sulphur, carbonate and sulphate of lime. This mass is treated with a boiling solution of lime sufficiently strong to decompose the cyanide of iron, but not to form any sulphide of lime with the sulphur. After filtering, the clear solution of ferrocyanide of lime is precipitated with a solution of sulphate of potash which throws down sulphate of lime as a precipitate and leaves ferrocyanide in solution, which is obtained by evaporation and crystallization.

The residue now consists of sulphur, protoxide of iron, sulphate and carbonate of lime. This is dried and roasted in ovens adapted to the purpose, and the sulphurous acid is conducted into lead chambers for the manufacture of sulphuric acid. The burnt residue is ochre (oxide of iron).

Laming's preparation is sometimes prepared with little, or even without lime, in which case the copperas is mixed with the natural oxide of iron (ochre), and the by products in this case are more easily obtained.

In Lybel's works at Vienna, 2,400,000 lbs. of sulphuric acid and 1,000,000 lbs. of ochre, beside ammonia salts and prussiates, are produced yearly.

11 Park Square, Boston, Mass.,
April 7, 1875.

Gas Purification and the Ammonia Manufacture.

[Correspondence of the London *Journal of Gas-Lighting*.]

Sir: In your issue of March 9, 1875, on page 333, you do me the honor to copy some portions of a professional report made by me in the summer of 1868—nearly seven years since—to the Manhattan Gas Light Company, of New York city. In doing so, through some mistake, you state that this report was "written two years ago," being unaware of the fact of its former publication, in entire form, in your own columns on January 19, 1869 (vol. xviii., p. 57), more than *six* years since.

Nevertheless, I am much pleased to have this opportunity of introducing to your readers a few words in discussion of two or three points in this report.

For the first of these, I must refer back to the original publication in your columns in 1869, and would beg attention to a sentence in the introductory (some may call it theoretical) part, which is all omitted from your recent quotations. To wit:

"We have shown above that the hydrosulphuric acid of the gas passes in the purifier into the form of sulphide of calcium (CaS), which, as shown long ago by Berzelius (Gmelin; ed. of 1843, vol. ii., p. 200), combines with sulpho-carbonic acid (bisulphide of carbon) to a sulphur salt of considerable stability."

This was the first setting forth, in this form (so far

as I have yet learned), of the *theory* of the mode of sulphur purification, afterwards worked out practically, and patented, under date of March 19, 1872, by Mr. Patterson, and which has given rise to so much discussion in your columns. I wish here also to take the opportunity to point out, as pertinent to the history of this matter, that your eminent chemist, Stenhouse, before 1860, made investigations on gas purification, with a view to remove bisulphide of carbon, and that he even filed a provisional specification in your patent office (July 19, 1860, No, 1752), in which he actually includes the use of *alkaline sulphurets*, in combination, however, with alcohol (or wood spirit, or fusel oil), his object being to form, with the bisulphide, *xanthates*, *xanthomethylates*, etc. Curiously, Dr. Odling, in a lecture delivered by him (and published in your columns), in the summer of 1872, speaks of his having himself, independently of Mr. Patterson, experimented with the sulphides of calcium and of the alkali metals. attributing likewise the reactions leading to the absorption of the bisulphide, to the formation of xanthic acid and xanthates, apparently without being aware of the previous publication of Stenhouse. As, however, alcohol, or some homologue thereof, must be present to form a xanthic compound, Dr. Odling's suggestions do not seem to fit the case. It seems much more probable that the action in the gas purifier is due simply, as first viewed by myself, and subsequently (as shown above) by Mr. Patterson, to the formation of the Berzelian *sulphocarbonate of calcium sulphide*.

The next point I would request leave very slightly to notice involves an admission, on my own part, of hasty and unwarranted conclusions; being those set forth in the first two paragraphs of your recent extracts. I have there stated that the composition of iron used by the New York Gas-Light Company—that of St. John and Cartwright—contains "a common limonite ore;" and that when introduced into the purifiers in bulk, there is less extent of absorbent surface, and hence an efficiency less than that of lime as used in sieves and hurdles. Both these assumption I found, as regards this special purifying composition, on subsequent thorough examination, to be in error; and this preparation has since been introduced into several of our gas works. I must not occupy. here, however, further space with a matter of only cis-Atlantic interest.

My third and last point is one which should have awakened new attention on your side the water, through the recent interesting report of Dr. Letheby (in your Journal of Feb. 2, 1875). I refer to that part which relates to the nuisance from the *sulphate of ammonia* manufacture.

Unluckily, the special passage in the original of my report, in which I indicate, describe, and explain this nuisance, as then (in 1868) exemplified in New York, is one of those omitted from your recent extracts; and I shall have to refer your readers back for this also to your complete publications in 1869. (In the first closing paragraph, however, of your extracts, there is a brief reference to this topic.)

I believe that I may claim—certainly so far as my own knowledge extends—to have been the first to point out publicly, in this report of 1868, the existence and the very grave character of this civic nuisance. It is only within a year past that our Metropolitan Board of Health in New York has taken up this matter of the ammonia-nuisance, and what they will do with it remains yet to be seen.

It has appeared to me that it might be interesting and, possibly, instructive to some among your readers, to quote for them a paragraph which I clipped from one of our city journals, relating part of the history of this struggle during the summer of 1874;

"One thing is puzzling the sanitarians now, and that is to discover whether the city gas houses create all the nuisances which have been freely, but with much indefiniteness, ascribed to them. There was a hullabaloo about it a few weeks ago, but the gas men invited the fullest inspection of their works, and Dr. Day says it was, at the least, difficult to trace the abominable smells that often filled the air of the east side, between Eighth and Thirty-fourth streets, after dark, to any processes in the gas manufacture. However, in examining the subject, it was found that the ammonia works at Avenue B and Thirteenth streets, contributed largely to the smell, and they were stopped. Then the smells stopped. The proprietor got new apparatus, with permission to use it, and began again. Suddenly people began to complain that the smells were renewed, coming into the house this time, however, by way of the sewer traps instead of a window. The ammonia man was dumping his refuse into the public sewer. That was stopped, and the smells stopped again. This was two weeks ago, and the works are now idle. The apparatus, it appeared, had got out of order, and new apparatus is preparing. This history is given merely as an example of how much fighting, how much persistence and patience it takes to reform any one nuisance of long date. The trouble is not so often that a man won't see, as that he can't see why his trade is a nuisance. If he won't see, he can be kicked out of the city, but if he can't see he must be instructed, which is a much longer process. The most difficult and worthy, and withal the most thankless, tasks of the health inspector lie among just such wilfing and benighted people—tasks which have been but little appreciated, but which do tell at length, if slowly, upon the immense bulky stupidity of a great city."

HENRY WURTZ.

HOBOKEN, N. J., April 5, 1875.

Important Public Works in London.

Twenty years ago the "Metropolitan Board of Works" was created to search through no less than eighty different acts of Parliament.

Its first great work was the perfection of a system of sewerage. This is now almost complete, and a mighty work it is. An area of 118 square miles has been undermined with intercepting sewers of an aggregate length of eighty miles. These sewers are so large that on a rainy day, when they are filled to their utmost capacity, they receive 63,000,000 feet of drainage, a quantity equal to a lake of 482 acres in extent and three feet deep. In that part of the metropolis which lies north of the Thames are three great lines of sewers. The High Level Sewer taps the Fleet at the bottom of Hempstead Hill and runs thence through Kentish-Town, Holloway, Stoke Newington and Hackney, to join the Middle Level Sewer at Bow. It is seven miles long, and drains an area of 10 square miles. The Middle Level Sewer is nine miles and a half in length, and drains seventeen and a-half square miles. It begins at Kensal Green, and runs along Oxford street, Hart street, Liquorpond street, through Clerkenwell, by Old street road to Shoreditch, and thence along the Bethnal Green road to Bow. A branch, two miles long, passes from Picadilly across Leicester square and Lincoln's Inn Fields to join the great channel at King's road, Gray's Inn road. The Low Level Sewer, with its two branches from Homerton and the Isle of Dogs, is thirteen miles long. It starts from the Western Pumping Station, near Chelsea Suspension Bridge, runs through Pimlico to Vauxhall Bridge, thence along Milbank past the Houses of Parliament under the Victoria Embankment, and through the city and the East End to the Abbey Mills Pumping Station. This sewer drains eleven square miles. There are, however, another fourteen square miles to be connected with it when the Western Pumping station is finished. This area is drained by main lines from Chiswick, Fulham, and Acton, which converge near Cremorne, where up to the present time their contents still flow into the River Thames. When the Western Pumping Station is finished the whole of this sewage will be lifted a height of eighteen feet and poured into the great Low Level Sewer. The Outfall sewer, five and a quarter miles long, from Old Ford to Abbey Mills, together with the Fleet Sewer finished last June, the Wapping drainage now being carried out and the covering of Hackney Brook, make the northern drainage system complete. The southern system consists of a high level and a low level line, the former beginning one branch at Clapham and another branch at Dulwich, and drains twenty square miles, including Tooting, Streatham, Clapham, Brixton, Dulwich, Camberwell, Peckham, Norwood, Sydenham and part of Greenwich. The latter, ten miles long, drains a similar extent of area, nearly the whole of which is below the level of high-water in the Thames. The sewer begins at Putney and runs along the Thames bank by Battersea, Nine Elms, Lambeth, Newington, Southwark, Bermondsey, Rotherhithe and Deptford, where there is a pumping-station which lifts the whole of the sewage eighteen feet into the Outfall Sewer, where it mingles with that of the High Level Sewer and flows on to the Crossness Pumping-Station where it is again lifted from ten to thirty feet, according to the level of the water. These vast works drain an area of about one hundred and eighteen square miles, and will have cost, when the last link at Chelsea is completed, about £4,200,000.

Among the new labors of the board are shortly to be included a more thorough supervision and control of the gas and water-supply.

Spectroscopic Analysis.

The first application of the spectroscope in quantitative analysis has been made by Sir John G. N. Alleyne, of the Butterly Iron Works, near Alfreton, Derbyshire, and the result of his researches (in which he has been ably assisted by his son, Mr. Reynold Alleyne) was embodied in a highly interesting paper, read before the Iron and Steel Institute recently. The mode of procedure may be briefly explained thus With a modification of the Becquerel tube, and in an atmosphere which will not support combustion, he first observes the line given in the spectrum by a body containing a known quantity of phosphorus, and then substitutes the body containing the unknown quantity of phosphorus to be determined. The phosphorus lines are just blotted out by introducing hydrogen into the tube, and restored by replacing a portion of the hydrogen by a measured quantity of carbonic acid. The quantity of phosphorus is inversely as the quantity of gas used. He can estimate in three minutes quantities under 0·500 down to 0·020 per cent. or less, with accuracy; above 0·500 requires further investigation owing to the great power of the phosphorus lines. For the determination of small quantities of phosphorus in iron and steel, Sir John Alleyne's discovery is valuable, and may be regarded as laying the foundation of quantitative spectrum analysis generally.—*London Mining Jour.*

The Coal-Supply of the Pacific Coast.

The San Francisco *Bulletin* says:

Nothing, perhaps, gives a stronger assurance of the future prosperity of the Pacific coast than the discoveries of coal which are made. If the formations here are not entirely the same as those of Pennsylvania and Europe, but partake of the lignitic character, they have been abundantly tested for the purpose of fuel, and with satisfactory results. Nor is this lignitic formation confined to one particular section of the Pacific coast, but it is found in various degrees approaching anthracite, from British Columbia to the Gulf of California. Pacific coast coal is now almost exclusively used for railroad locomotives and for steamboats by the companies operating here, and for all classes of manufactures. Cheap fuel is the basis of great manufacturing interests, and in this respect the new industries of this coast have brightening prospects.

Coal is said to be practically inexhaustible on Vancouver's Island, and the Nanaimo coal fields are sending large quantities to the San Francisco market. The company is now represented as taking out about 300 tons per day from the old bed, three miles from the harbor, and their mine is down 1200 feet. A new vein has also been discovered about half a mile from the harbor, and when this is opened the supply will be increased to 500 tons daily. The present price of this coal delivered at the shaft is stated to be $5.25 per ton.

Coming southward, there is next the Bellingham Bay mine, which is taking out 100 tons daily, and the present vein is expected to last four years. The Ska-

☞ *For other reading matter see page* 30.

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FRIDAY, JULY 16, 1875.

WISHING TO MAKE THIS JOURNAL an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of these subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting *CHECKS*, or *POST OFFICE MONEY ORDERS*, as we are frequent losers where money is enclosed in letters.

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SULPHUR--PURIFICATION AND SULPHURIC ACID.

In our last, we went slightly into the subject of the great question, which has on this side of the Atlantic been very discouragingly ignored by the gas-profession, of turning the sulphur that passes into gas from gas-coal, to our use and profit; a thing which is done successfully and largely in Europe. In the columns of this present issue the topic comes up again, in two different connections.

We have, first, a valuable translation, extracted from the *American Chemist*, of an article by the German chemist Emil Kopp, upon the chemical treatment of the products of the purifying house, to convert them into commercially valuable substances; and we have next the interesting discussion at the May meeting of the AMERICAN GAS-LIGHT ASSOCIATION, in Washington, upon sulphur-purification by iron-oxide methods. From the first we learn that the amount of sulphuric acid thus made from the crude coal-gas of Vienna alone, is nearly *two and a-half millions of pounds* yearly, besides other valuable products. This amount of sulphuric acid, neutralized by the ammonia of the gas-liquor, from the condensers of the same works, would make about three million pounds of sulphate of ammonia, worth here, in New York, say five cents per pound; or one-hundred and fifty thousand dollars worth of this salt. In New York the amount that could thus be made, of sulphate of ammonia, altogether from the gas-houses, without any outside source of material, should be far larger doubtless than in Vienna.

From the debate in the Association, we learn, moreover, that the use of iron processes of purification (which, when introduced, require nothing further, except a little chemical skill and capital, to enable us to realize these valuable results) are making their way rapidly into favor throughout the American profession. In this *we* claim a large share of credit.

We feel it right to ask, in this connection, whether the method mentioned and recommended by Mr. Sutton, is not very close to that we have so long advocated, of St. John and Cartwright; of using in the first place, and adding to the iron composition, a mixture of iron-borings. In view of the fact that Mr. Sutton observed a constant "growing weaker" of his mixture; and of the other fact that the preparation of St. John and Cartwright, used so largely by the New York and Harlem Gas-Light Companies of this city, does not so run down, but, on the contrary, increases in power for many repetitions of use; would it not be well for this gentleman, Mr. Sutton, and others, to avail themselves of the aid of Messrs. St. John and Cartwright in this matter?

FREE-TRADE IN RATSBANE: TRUTH STRANGER THAN FICTION.

We said something about *potato-bugs* in our last. It is a subject which suggests the above heading, though the connection may not be obvious at once. The newspapers, in referring to the fear that many farmers very justly and prudently entertain, of poisoning their potatoes as well as their bugs, by the strewing of Paris-green over their fields, often volunteer the remark that they do not think there is any rational ground for apprehension on this score.

This is a matter in which we must continue to raise our own voice, weak or strong as it may be, in objection. We object not only to allowing Paris green to be spread over our fields, to contaminate the soil of our market gardens, but even to its being allowed, as it is, to be kept on open sale in our shops, so that an amount of poison which would sicken a city—by introduction into a distributing reservoir, for example—could be at any time purchased, without suspicion, by any maniacal or fiendish individual, and so introduced, with far less trouble or liability of detection than many of the murderous performances of such individuals often incur.

In America, we are happily endowed by Nature with a general absence of this deadly mineral arsenic, from our rocks, our soils, and our mineral waters; and we ought to keep ourselves so. Whether this is one cause or not, of the known longer average of human life in America than in Europe; it will be safer and better for us to admit that it is one such cause, and not to throw away or destroy our advantage in this respect, by sprinkling arsenic over our vegetation, all throughout the land. It is true the predatory insects must be destroyed, but let it be with such poisons—and they are known to be many—which have been given us by God for these special uses; which are endowed with deadly doom for all the insect tribes, while almost without hurt for man. Among such, none are more prominent or more familiar than the gas tar products, of which we spoke in this same connection in our last issue. Let these be used instead of arsenic.

Arsenic is, in fact, getting to be, throughout the world, almost as common as dirt. We doubt very much whether it would not be impossible, at the present day, in any country, to convict, on chemical evidence, before any jury, the most bungling arsenical poisoner, if he, or she, had a legal defender who would make such use as he might, of the argument furnished him by the almost universal distribution of the venemous element, throughout our most familiar walks of life. We have received medicines, ourselves, from drug stores, wrapped in arsenical papers, put up in Paris-green paper boxes, with arsenical paper caps tied over the corks, etc. We have often seen confectionery exposed for sale to young children wrapped in the deadly green paper. We have often found young children sucking toys painted with the horrible stuff, and with their mouths stained throughout with the venom. The Paris-green paper is one of the commonest in use for *binding school books*, and we have more than once taken such books away from our own young children, which had been given them by their teachers. Numerous deaths of children are well known to have been thus occasioned. No country can be called civilized in which such suicidal ignorance, such stupid slaughter of the innocents, is common. One more illustration only. It is very common to see a lawyer or his clerk, *put into his mouth*, to moisten the gummed side of it, a beautiful green paper disk, with scalloped edges, to attach to some document. These things are found in every lawyer's office in the land, and used constantly. They are seldom made of any other than the Paris green paper. Can this be ignorance, or are our lawyers all fatalists, and believe they can only "die when their time comes?" In commencing to write we had in our mind to refer to some of the wonderful facts developed of late, in Great Britain especially, of *open carts loaded with white arsenic* passing in open day through the country in some districts, with drivers sitting on the top of the hideous heap; such carts being often exposed all night openly to the rain; of strongly arsenical waters flowing from mines and metallurgica

works into streams of water afterwards drunk by large populations, and so on. These are facts. Everybody will remember the cargo of salt and arsenic together shipped to us from Europe a few months ago, which got a *little mixed* during a rough passage. This particular mixture was discovered in time, but have *all* such been discovered? The water we ourselves drink comes from a stream on one of whose tributaries is a large chemical works, which so contaminates the said tributary with arsenic, that cattle drinking of it have been poisoned to death. These things we say, are facts, on both sides of the Atlantic; but really, while we wrote the first part of this article; especially when we thought of the recklessness of the public press, which has actually recommended their rural readers, in many cases, to pile on the Paris green on their potato-patches with a perfect looseness; these other things seem trifles, as flat and stale as they certainly are unprofitable; and our enthusiasm and zeal for the eause of humanity seems to wilt down into a sort of sentimentality, which is certainly ludicrously lame and impotent, if not downwright sickly.

EXTRAORDINARY SPECIMEN OF AMERICAN N.

[The following note was received, *in proof*, just as we went to press with the last issue, "with the compliments of the Editor of the *London Mining Journal*." We regard it as possessing interest to justify its insertion in our most prominent place.—ED.]

There is now being shown in the Birmingham district an extraordinary specimen of iron-making in the United States. It is a portion of a sheet of very thin iron, so thin that though its surface dimensions are 4 inches by 3½ inches, yet its weight is only 3½ grains, apothecaries' weight. The breath of the nostrils will drive it away almost as if it were the cinder of burned paper. The thinness is itself very surprising, but the extraordinary part of the matter is that the iron has has been made from what the Americans term a "muck bar," obtained from a Danks's puddling-furnace at Pittsburgh without being re-worked. Thus, an extreme thinness of iron, which it is almost impossible to secure from the very best materials, worked and re-worked many times over in the usual way, bas been got from the iron in the state of crudeness in which it was found upon leaving a mechanical puddling-furnace. It is assumed in this country that the iron has been made from the ordinary district pigs, and the specimen is deemed to demonstrate the great value of machine puddling as practised by the producers of the iron. And the specimen has an important commercial as well as a scientific significance. There is to the iron-makers here the disagreeable inference that if crude iron can be worked to such foil as is described, then that sheets of greater thickness, but still of a thinness that brings them to the narrowest gauge embraced in the sheets generally made in this country, and which realise very high prices, should be produced by the United States ironmasters at figures so much below those at which alone lattens and button iron, for instance, can be made in this country, that the Americans must be in a position to successfully compete with the British ironmaster for those kinds even in his home market. Men in the trade who have seen the specimen are expressing the belief that the American should be able to compete with the English maker in the Antepodean-colonial, the Russian, and the Chinese markets, whither large consignments of British sheet-iron are constantly going.—(London) *Mining Journal.*

REMARKS.

There is no question that it would be practicable, with proper manipulation and subsidiary devices, to convert iron into a material suit able for the purposes of paper, certainly for writing upon with a suitable ink; thus leading to the introduction of books and records which would be indestructible, even by fire, under ordinary circumstances.

The new era in the art of siderurgy, upon whose threshold we are, in the introduction of *oil-fuel*, under the Eames system, will render the working of iron into foil, on a large scale, a matter of ease and of small cost. We trust that experiments will be directed into this path, as soon as other more pressing matters, of larger immediate importance, have been put on foot.

GAS STOCKS.

The dealers in gas stocks desire that this Journal give regular quotations of the market value of all gas stocks sold in the city. If no objection be made, we will publish reliable quotations under the broker's signature.

$30 per Dozen.

DEAN'S

NEW PATENT (1873)

Screening Scoop SHOVEL

FOR COKE, COAL, ASHES, AND OTHER SUBSTANCES.

The frames are 12 by 18 inches, with seven bars, and are made of the best malleable Iron. They can be wired between bars by an arrangement of holes a quarter of an inch apart, by an ordinary person, to screen any size substance desired. They are warranted to be the most durable and practical Screening Shovel made, or money refunded.

Reference—all New York Gas Companies and Hotels.

Price, $30 per Dozen.

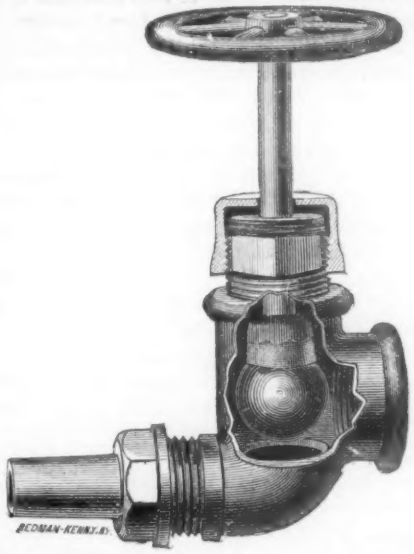
Sample sent gratis to any Company, if desired.

☞ Smaller sizes on hand. Please address orders to A. SEE & SON, N. Y. Shovel Works, No. 1358 B'way, N. Y

SOMETHING NEW.

THE HUMPHREYS VALVE.

FOR USE AT CONSUMER'S METERS.



This valve is made of malleable iron, and is specially adapted to encounter the heat of burning buildings, in which the ordinary meter cock (made of brass) will crumble or melt. It is opened or shut with ease, by sliding the stem up or down, the latter being held where desired by the friction of the packing. It is perfectly tight, and is not so liable to get out of order as the meter cock: its cost being about the same.

The great advantage of this valve is, that in case of fire—when the gas cannot be shut off by hand, the heat will automatically close the valve, and thereby stop the flow of gas. The certainty of its action in this way will be at once apparent when it is observed that the valve proper is a round iron ball, attached with a soft solder composition (melting at 250°) to the end of the stem, and held directly over the seat. The heat of the fire, melting the solder, releases the ball, which drops into the seat, and shuts off the gas.

Peference is made, by permission, to the following gentlemen, well-known to the gas fraternity—H. Q. Hawley, President Peoples Gas-Light Company, Albany, N. Y.; Isaac Battin, Engineer Albany Gas-Light Company, Albany. N. Y.; F. A. Sabbaton, Engineer Gas-Light Company, Troy, N. Y.; J. C. House, Proprietor Union Gas Works, Lansingburgh and Waterford.

Send for price list to WILLIAM HUMPHREYS, Waterford, N. Y.

TO GAS COMPANIES, AND CITY GOVERNMENTS.

DYOTT'S PATENT CHAMPION STREET LAMP

Doubles the Light with the same quantity of Gas used in other Lanterns. *All others* waste half their light, illuminating the sky, or if the top is of metal, absorb it.

SINGLE TOP GLASS LAMPS BOTH GLOBULAR AND SQUARE become heated if a good light is put in them, and rain, hail or snow falling upon the HEATED GLASS BREAKS IT. When one glass is broken the wind will either blow the flame against the others and break them, or destroy the entire Lamp. *Nine-tenths of the breakage and cost of repairs of other* street lamps is owing to that cause.

DYOTT'S "CHAMPION" is the only DOUBLE TOP—the only Lamp that has the Opaline White Dome, which is a *never changing reflector;* it doubles the power of, and throws the light to a greater distance. It is also a perfect *protecjor*, shielding the heated top or the lamp from all inclemency of the weather. The white dome is kept cool by the passage of air between it and the transparent globe below. Rain, hail or snow will never break either the globe or dome. The globe rests upon rubber cushions, and is supported laterally by elastic springs, so that contraction or expansion of the globe, or jarring of the post will not break it. They can be cleaned in one-fourth the time required to clean other lanterns. The metallic portions are of iron, copper and brass, and are the most durable, economical, efficient and cheapest lamps in existence. For public buildings, and wherever an ornamental and powerful light is required, they are made in CLUSTERS of 2, 3, 4, 6, 7 and 10 lamps, which have no equal in this or any other country for *beauty, durability, efficiency* and economy, either in cost, use or ornamentation. Designs furnished when requested for specific purposes. Gas companies, or those who have the lighting of Cities in charge, are solicited to communicate with us in reference to the agency for its introduction.

The Franklin Institute has awarded our CHAMPION LAMP the highest premium: (they give a silver medal) and its Committee on Science and the Arts has recommended it as the best lamp in use. It has also invariably taken the highest premium at every Exhibition at which it has been presented, and elicits the strongest commendations wherever it is used. We have several new and handsome patterns of POSTS for Corporations, Parks, public and private use, also for clusters of lamps, that are not excelled in beauty or price at which they are furnished. DYOTT MANUFACTURING CO.,
374-6meot 114 South 2nd Street, Phil'a, Pa.

Sole Agency for the United States.

The PELOUZE & AUDOUIN Condenser.

Patents, May 26, 1874; July 21 1874.

ADDRESS

JAMES R. SMEDBERG,

Consulting Engineer, San Francisco Gas-Light Co.,
San Francisco, California.

OR

HENRY CARTWRIGHT. C. E.,

2107 Green Street, Philadelphia, Pa,

git mine, also in Washington Territory, has only been opened for 20 feet, simply for testing its value. The mines around Seattle are turning out from 200 to 400 tons daily, and this can be indefinitely increased with better means of transportation to tide-water. The new mines at Puyallup, 28 miles from Tecoma, are also developing the existence of a large area of coal, and a project is on foot for constructing a narrow gauge railroad to bring the coal into market.

The Coos Bay coal fields, of Oregon, are rapidly developing, and coal of lesser commercial value is constantly being discovered in other sections of the State.

In Nevada two important discoveries of coal have been made during the last 12 months—the Pancake mines and those in El Dorado canyon, Lyon county. The latter has been tested for steam purposes at the mines on the Comstock lode, and the proprietors are arranging for the construction of a narrow gauge railroad from the canyon to Virginia City.

Coal also exists in several sections of California. In Shasta county one of the largest beds on this side of the continent has recently been discovered. A few months ago extensive deposits were found in Monterey county. The Lincoln mine in Placer is developing, and two narrow gauge railroads are to be constructed to the coal fields of Ione Valley in Amador county. Coal is also reported to have been found in Butte and Colusa counties, and only awaits means of transportation to bring the same into market. The prime factor in all manufacturing enterprises is coal, and from today's outlook, the encouragement to enter upon manufacturing enterprises was never greater than at present.

Singular Explosion in England.—A disastrous explosion of gas occurred at a public lamp at the foot of Leith Walk, about eight o'clock on Saturday evening, as a lamplighter was lighting the jet. So violent was the explosion that the lamp and lighter were blown into the air. The lamplighter escaped with few injuries, but a number of children were struck by the pieces of broken lamp-post. One of them, James Allen, four years old, was killed; another boy received a dangerous scalp wound, and a girl named Helen Cameron is scarcely expected to recover. Parts of the lamp post were driven a distance of 79 or 80 yards.—*London Jour. Gas-Lighting.*

[Could this have been due to acetylene that had been absorbed by some copper or brass surfaces, that might have been wrongly used about the lamp post? Should more such extraordinary phenomena transpire, our British contemporary ought to look into it.—Ed.]

New Oil Conduits.—While the Columbia Conduit Company is struggling to get across the track of the West Penn. R. R., a new pipe line company has been organized in this city, which, if successful, will afford some relief from the railroad monopoly. It is proposed to lay a pipe from Millerstown to Freeport, a point on the Allegheny river, some miles above Pittsburgh. From this point it is proposed to transport the oil in barges to the refineries at this city and other points.—*National Oil Journal.*

PRICES OF FOREIGN AND DOMESTIC GAS COALS.

[Reported Expressly for this Journal.]

JULY 2, 1875.

DELIVERED IN NEW YORK.

(Duty, 75 cents per ton, gold. Freight to New York $2 25 currency. Cost of above coals delivered in New York, $5 25 @ $6 00½, currency.)

Pennsylvania Coals.

Penn Gas Coal—At Amooy	$7 00	@	0 00
Westmoreland—At Amboy	7 00	@	0 00
(In New York both the above coals $7 50)			
Shafton	7 50	@	0 00
Youghiogheny	7 75	@	0 00

West Virginia Coals.

MurphyRun	$7 40	@	0 00
Despard	7 40	@	0 00
West Fairmont	7 40	@	0 00
American Gas Coal	7 40	@	0 00
Fairmont	7 40	@	0 00
Newburgh Orrel	7 40	@	0 00
Pinnickinick	7 40	@	0 00
Cloverhill of Virginia	6 00	@	6 50
McKenzie Compound Mixture			— —

American Cannel Coals.

Peytona of West Virginia	$12 50	@	00 00
Darlington of Pennsylvania			— —
Cannelton Cannel			12 50
Red Bank—at Philadelphia			7 60
" —at South Amboy			9 00

Asphalts.

Albertite of New Brunswick	$— 00	@	— 00
Ritchie Mineral of West Virginia	18 00	at Balt'e.	
Trinidad Bitumen	— —	@	14 05

The Waverly Coal and Coke Company of Pittsburgh, have contracted with the Pittsburgh Gas-Light Co. for 40,000 tons of their Youghiogheny coal, on private terms,

Advertisers Index.

☞ In looking for advertisements, see figures 1 to 12, within brackets, at head of advertisement pages.

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American Meter Co.—West 22nd st., N. Y., Arch and 22d st., Phil., 23 West st., Boston 11
Agency for the Gibson Improvement—W H. Grenelle, 42 Pine street, N. Y. 10
Cast Iron Gas and Water Pipe—S. Decatur Smith, York and Meyer streets, Phila., Pa 8
Cast Iron Gas and Water Pipes—R. D. Wood & Co., Philadelphia Pa 10
Cast Iron Gas and Water Pipe—Jno. McNeal & Sons, Burlington, N. J. 8
Franklin Foundry and Pipe Works—Jas. Marshall & Co., 23 Nineteenth street, Pittsburgh, Pa. 9
Gas Valves (Chapman) 75 and 77 Kilby St., Boston, Mass. .. 3
Gas-Burners—C. Gefrorer, 259 Commerce street, Phila., Pa 9
Gas Purification—St. John and Cartwright 5
Gaylord Iron and Pipe Company—90 and 92 Broadway, Cincinnati, Ohio 9
Gas Meters, etc.—Harris, Griffin & Co., 12th and Brown streets, Phila., Pa 10
Gas Meters, etc.—Wm. W. Goodwin & Company, 1012 Filbert street, Phila, Pa 11
Gas Meter Manufacturers—Harris & Bro., 1117 Cherry st., Philadelphia, Pa 11
Gas Fixtures, Etc.—Archer & Pancoast Manufacturing Co. 67 Greene Street, above Broome, N. Y. 2
Gas Fixtures, Etc.—Mitchell, Vance & Co., 597 Broadway .. 7
Gasholders, Etc.—Deily & Fowler, 39 Laurel st., Phila., Pa.. 4
Gas and Water Pipes—B. S. Benson & Son, 68 B'way., N Y
Gasometers, &c.—Keystone Iron Works—2132 Filbert st., Philadelphia 2
Gas Screens—American Gas Screen Manufacturing Co., Haverhill, Mass 4
Jersey City Gas Meter Works, 14 Morris st., Jersey, N. J.... 8
Lime Hurdles.—Manhattan Lime Hurdle Co., Geo. W. Day, Treas., No. 3 Railroad Square, Haverhill, Mass 2
Lava Tips and Scotch Tips—Charles H. Meyer & Co., 227 Chestnut street, Phil. Pa 8
National Tube Works Co., 78 William St., N. Y 7
Patent Conically Slotted Wood Trays—John L. Cheesman, 147 and 149 Avenue C., N. Y. 4
Patent Gas Exhauster—Smith & Sayre, 95 Liberty sttreet .. 4

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Cannelton Coal Co. of West Virginia—J. Tatnall Lea, 325 Chestnut street, Phila, Pa 8
Despard Coal Co.—Parmelee & Bros., Agents, 32 Pine st., New York 7
Gas Coals—Bird, Perkins & Job, 27 South st., N. Y. 7
Monongahela Gas Coal—56 Exchange Place, Baltimore, Md. 6
New York and Cleveland Gas Coal Company—384 Penn Avenue, Pittsburgh, Pa 6
Ohio Gas Cannel—G. Merryweather, Pine cor. Wm. sts. 6
Peytona Cannel Coal—S. E. Low, 58 Broadway, N. Y 6
New York 3
Red Bank Mining Company—Bird, Perkins & Job, 27 South st., N Y 7
Sterling Coal—Freeman Butts, Cleveland, Ohio 6
The Newburg Orrel Coal Co.—Chas. W. Hays, Agent in New York, Trinity Building, 111 B'way, Room 7 6
Tyrconnell Gas Coal—52 S. Gay Street, Baltimore, Md 6

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Cast-Iron Pipes and Fittings—B. S. Benson, 52 East Monument street, Baltimore, Md .....
Continental Works—T. F. Rowland, Greenpoint 6
Camden Iron Works, Camden, N. J.—Jesse W. Starr & Sons 5
Gloucester Iron Works—J. P. Michellon, Sec., 6 North 7th street, Phila., Pa 4
Mill Street Foundry.—Geo. Stacey & Co., Cincinnati O 5
National Foundry and Pipe Works—Wm. Smith, Carroll, Pike, Smallman & Wilkins streets, Pittsburg, Pa 6
Pascal Iron Works—Morris, Taskar & Co., Philadelphia 12
Providence Steam and Gas Pipe Co., Providence, R. I.—H. A. Branch, Agent 8

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Valves for Water, Steam and Gas—Ludlow Valve Man'g Co., 946 River street, Troy, N. Y 6
Water Pipes, etc.—S. Fulton & Co., 412 Walnut st., Phila ... 7

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B. Kreisher, Clay Retorts, etc., 58 Goerck st., New York 8
Cheltenham Fire Brick and Clay Retort Works—Evens & Howard, 916 Market street, St. Louis, Mo .....
Jersey City Fire Brick Works—J. H. Gautier & Co., Greene, Essex and Bergen sts., Morris Canal Basin, N. J 8
Manhattan Clay Retort Works, 15th st., near Av. C, N. Y .. 8
Philadelphia Fire Brick Works, Vine and 23d sts., Phila 8
Retorts, Etc.—Geo. C. Hicks & Co., Baltimore Md 1

LAMPS, STOVES, PETROLEUM, ETC.

Patent Lamp Post—J. W. Graham, Chillicothe, Ohio, or A. M. Callender, office of this Journal 9

MISCELLANEOUS.

Analysis and Testing of Gas Coals—Prof. Henry Wurtz, 12 Hudson Torrace, Hoboken, N. J. 10
Architect and General Gas Engineer—William Farmer, 111 Broadway Room 95 5
American Gas Works Construction and Supply Company—61 Broadway, N. Y 3
Cements—S. L. Merchant & Company, 76 South st., N. Y ...
Contractors for Gas Works, Etc.—Murray & Baker, Fort Wayne, Ind 2
Fodell's System of Bookeeping—A. M. Callender & Co., 42 Pine st., New York 1
Gas Engineer—B. E. Cholar, 914 Olive St., St. Louis, Mo ...
Gear Wheels—Scott, 98 Chambers St., N. Y 5
Gas-Light Company of America, 63 and 64 Drexel Building, New York 2
Kidd's Gas Consumers Guide—A. M. Callender & Co., 42 Pine Street, N. Y .....
Massachusetts Institute of Technology—Samuel Kneeland Boston, Mass .....
National Coal Gas Company—H. P. Allen, 4 Warren street New York 6
Retort Setting and Working—E. S. Cathels, Montreal, Can. 8
School of Mines, Columbia College, East 49th st 9
Screening Shovels—O. R. Butler, 126 Maiden Lane, N. J 7
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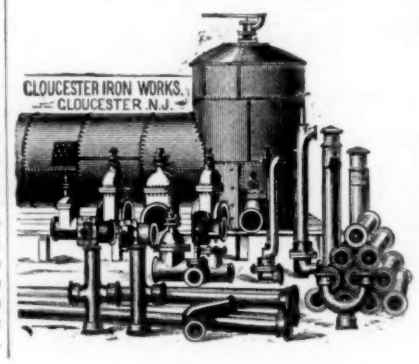
Screening Shovels—G. W. Dean, 1358 Broadway, N. Y .....
Springfield Gas Machine—Corner Canal and Centre St. ....
Slade's Automatic Fire Governor—Jas. Slade, Gas Works, Yonkers, N. Y .....
Scotch Fire Brick—S. L. Merchant & Co., 76 South Street, corner Maiden Lane, N. Y .....
Works upon Gas—D. Van Nostrand, 23 Murray street and 27 Warren street, N. Y 9



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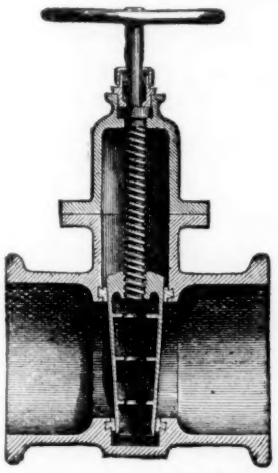

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They afford a direct passage the full size of the pipe. The seats are made of an alloy similar to BABBITT metal, specially prepared for the purpose, and superior to all other metals used for the seats of Gas Valves. It does not corrode under any circumstances to which it is exposed.

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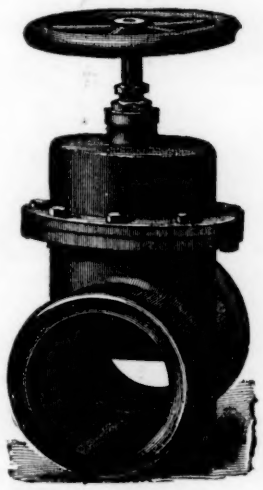

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LAWRENCE GAS-LIGHT COMPANY, LAWRENCE, MASS.
PEOPLES GAS-LIGHT COMPANY, BROOKLYN, N. Y.
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SOUTH BOSTON GAS-LIGHT COMPANY, BOSTON, MASS.
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LYNN GAS-LIGHT COMPANY, LYNN, MASS.
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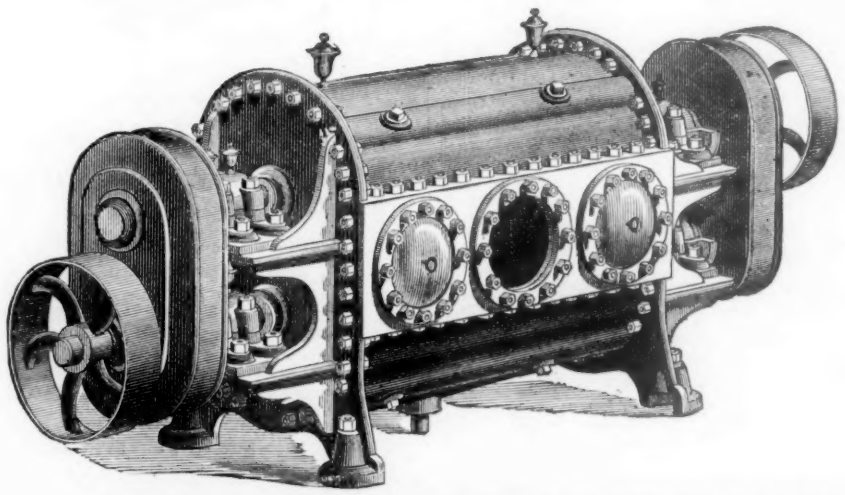

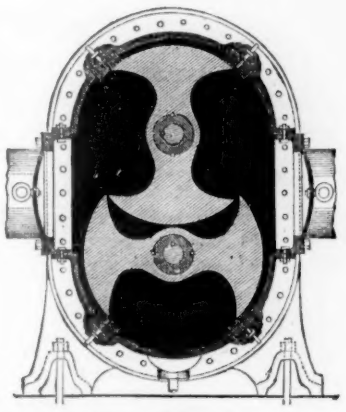

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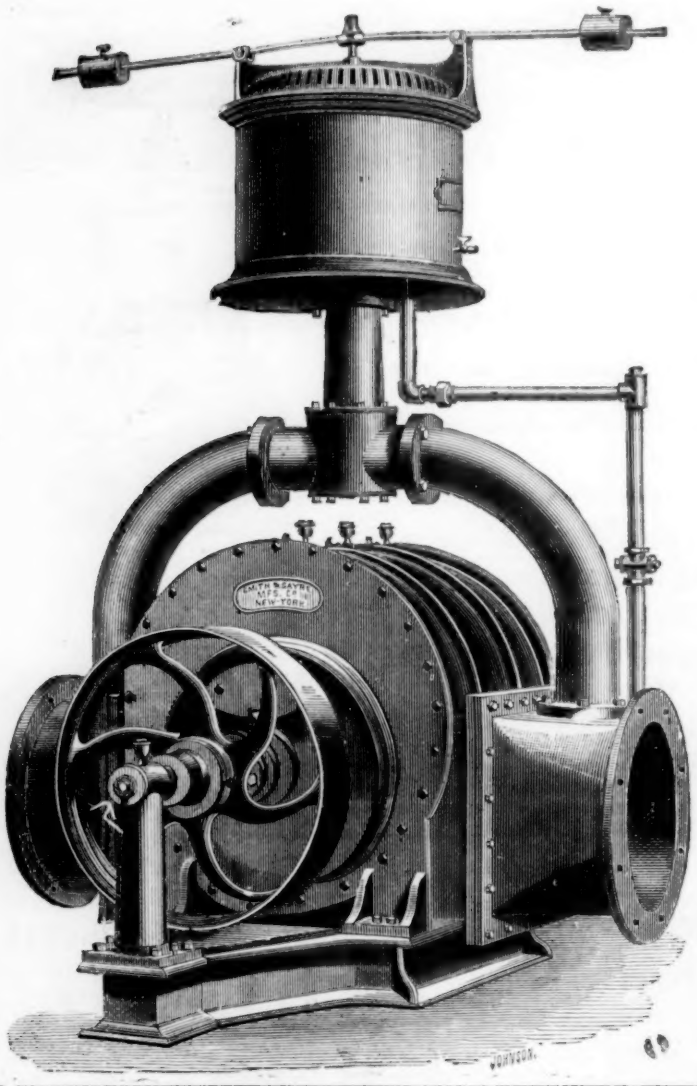

They are made to pass from: 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, and can be driven with one-third the power required to drive the ordinary fan. compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

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355-

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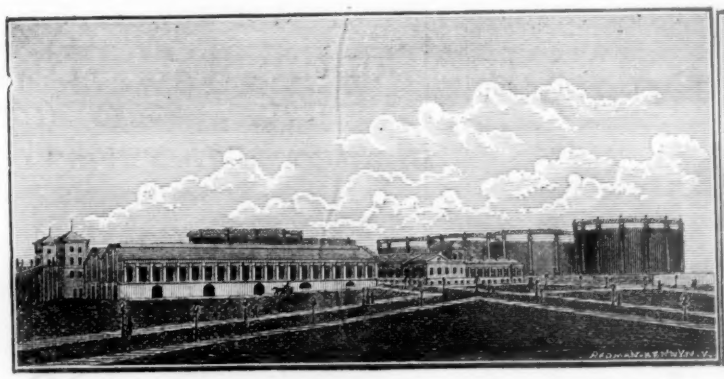

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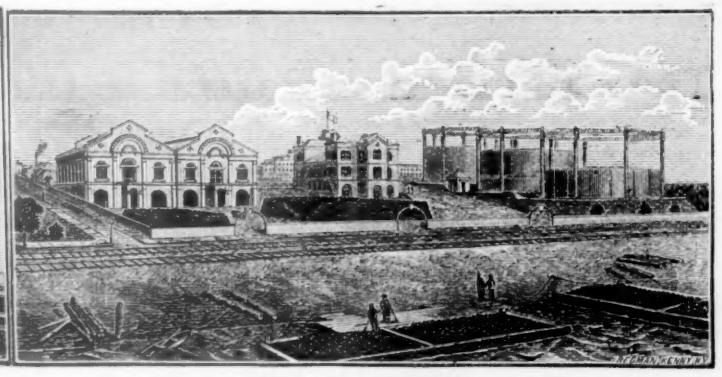

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W. W. SCARBOROUGH, President Cincinnati Gas-Light Company, Cincinnati, Ohio.
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590-6t

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Manufactory at Haverhill, Mass.

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Formerly with AMERICAN GAS SCREEN CO.,
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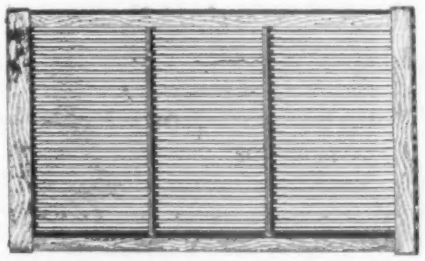

The Screen is made with an ash or oak frame, perforated with ROUND RATTANS, turned and reeved through, drawing the frame firmly together, strengthening it *without the use of nails or rivets.*

This Screen is reversible, can be used either side up, gives a large purifying capacity; there is no clogging by foul lime, as the rattan presents a smooth surface and can be cleaned very easily. It is considered by all Gas Engineers who have used it to be the best Screen now in use.

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384-6t

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To Gas-Light Co's.

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in the erection of new, or the extension of Gas Works.

He is prepared to furnish plans and Specifications, embracing all the latest improvements in the MANUFACTURE OF COAL GAS, at short notice, and on reasonable terms. His experience of THIRTY YEARS in the construction of Gas and Water Works, Railroads, Tunneling, etc., enables him to refer with confidence to any of the Works erected by him, as a guarantee of satisfaction and ability.

By arrangements with reliable manufacturers of all MATERIAL and SUPPLIES used by Gas Companies, he is prepared to furnish promptly all such orders, with best selections, and to give satisfaction as to prices, terms, etc., and respectfully solicits a share of patronage.

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Gas Consumers' Guide

Enables every Gas Consumer to ascertain at a glance, without any previous knowledge of the Gas Meter, the quantity and money value of the Gas consumed. Also the best method of obtaining from Gas the largest amount of its light.

It will be to the advantage of Gas Companies to supply their Consumers with one of these Guides, as a means of preventing complaints arising from their want of knowledge in regard to the registration of their meters. For sale by

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OF WEST VIRGINIA.

Offer for sale the following Coals, from their Colliery at CANNELTON, Kanawha County, West Virginia, delivered at RICHMOND, Va.:

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acknowledged to be the most valuable ENRICHER produced in this country, a gross ton yielding 10,000 cubic feet of GAS of 64·54 CANDLE POWER; COKE 32 bushels, of good quality.

CANNELTON SPLINT,

a SEMI-CANNEL of an excellent quality, a gross ton producing 9,500 cubic feet of Gas of 20 CANDLE POWER; COKE, 30 Bushels, fair quality.

CANNELTON CAKING COAL.

Recent experiments made with this Coal have established the fact that the Kanawha Valley can furnish GAS COAL equal to those produced from any other section of the country; that mined by the Cannelton Co. yielding from the gross ton 10,000 cubic feet of Gas of 16 CANDLE POWER 35 bushels of COKE of *superior quality*—only *one* per cent. of *sulphur*.

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This coal yields 10,000 cubic feet of Gas, with an illuminating power of over 16 candles. Forty bushels of very superio Coke, with little Ash, and scarcely any clinker. 304-1y

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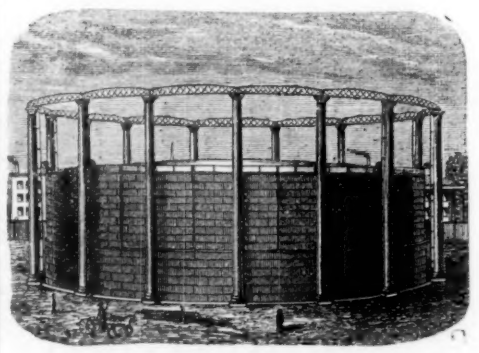

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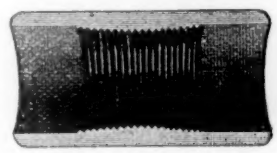

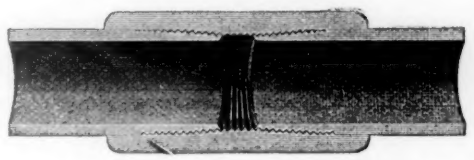

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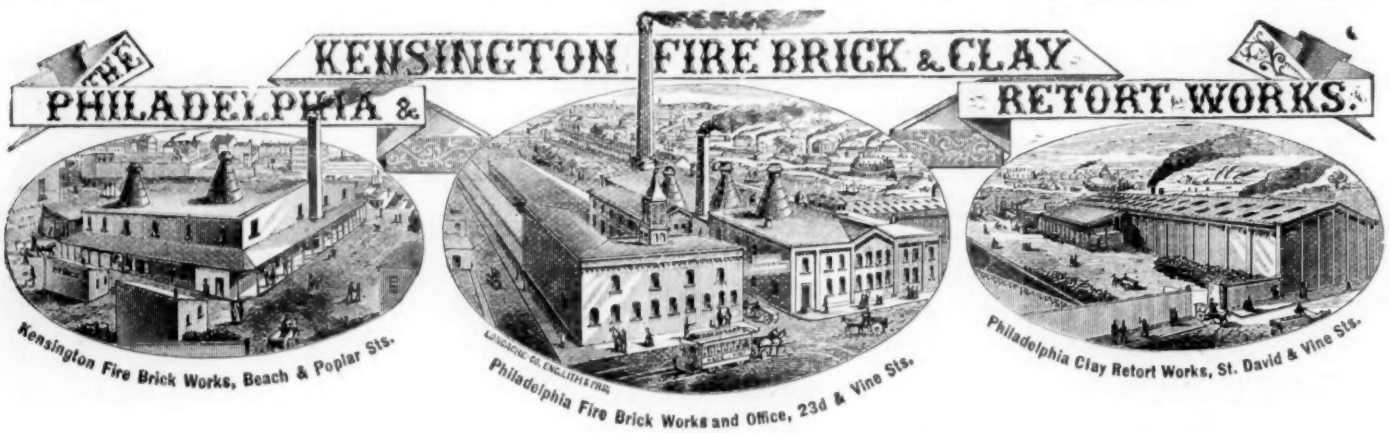
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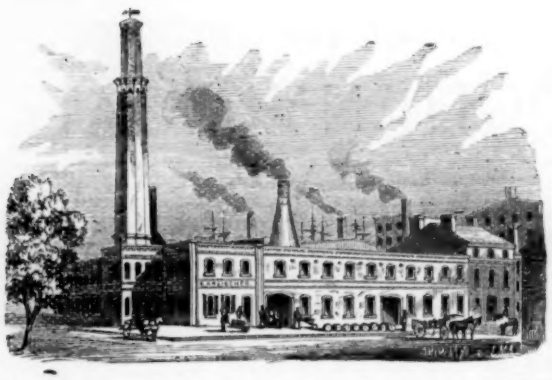

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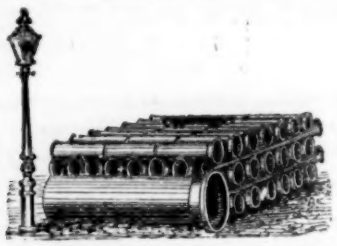

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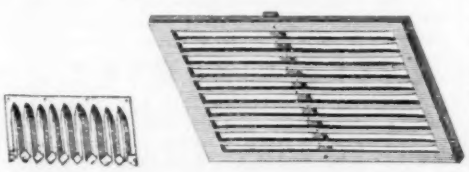

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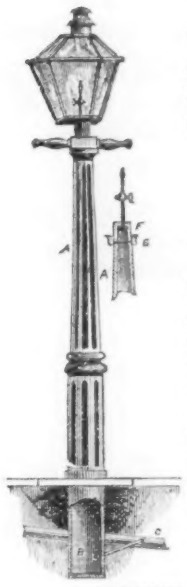

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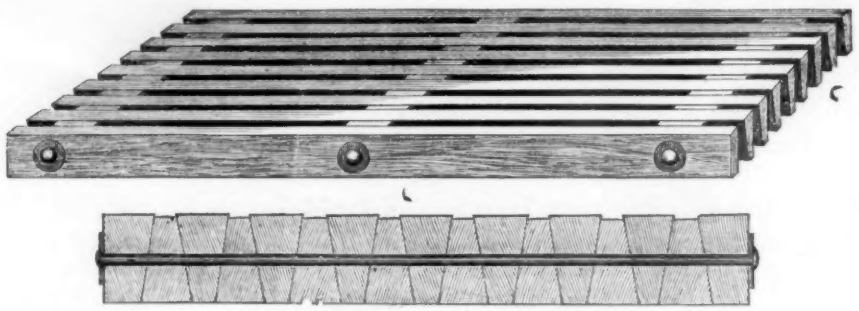

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